SEMESTER STUDY PLAN

ALGEBRAIC STRUCTURE

(COMPULSORY COURSES)

DEPARTMENT OF MATHEMATICS AND DATA SCIENCE

FACULTY OF MATHEMATICS AND NATURAL SCIENCES

UNIVERSITAS ANDALAS

2024

SEMESTER STUDY PLAN (SSP)
BACHELOR PROGRAM OF MATHEMATICS
FACULTY OF MATHEMATICS AND NATURAL SCIENCES
UNIVERSITAS ANDALAS

Course Name	Course Code	URL *I-Learn*	Credits	Semester	Compilation Date
ALGEBRAIC STRUCTURE	MAT62112	https://sci.ilearn.unand.ac.id	3	4	12 May 2024

Person In Charge	Study Plan Creator	Head of Research Group	Head of Study Program
	Nova Noliza Bakar, M.Si	Nova Noliza Bakar, M.Si	Dr. Noverina Alfiany

	Intended Learning Outcomes	
	ILO-5	Students can formally and correctly prove a simple mathematical statement using facts and methods that have been learned. PI-1: An ability to identify formal structures and analogous forms in mathematics PI-2: An ability to use facts and apply methods to prove simple mathematical statements PI-3: An ability to present simple mathematical statement proof rigorously (sequentially and conscientious) PI-4: An ability to conclude or interpret result of the proving simple mathematical statement
	ILO-9	An ability to apply knowledge of mathematics in career and involve in life long learning PI-1: An ability to carry out learning independently to deepen and expand the knowledge that has been obtained
	Course Learning Outcomes (CLO)	After attending this lecture, students are expected to:
	CLO-1. An ability to explain the meaning of groups, subgroups, normal subgroups, and quotient groups and prove related properties (ILO-5: PI- 1, PI-2, PI-3, ILO-9: PI-1)	
	CLO-2. An ability to explain the understanding of homomorphisms and isomorphisms in groups and prove related properties. (ILO-5: PI- 1, PI-2, PI-3, PI-4, ILO-9: PI-1)	
	CLO-3. An ability to explain the meaning of rings, classes of rings, homomorphisms, and ring isomorphisms, and prove related properties (ILO-5: PI-1, PI-2, PI-3, PI-4, ILO-9: PI-1)	

	CLO-4. An ability to explain the ideal understanding and quotient ring and prove related properties. (ILO-5: PI-1, PI-2, PI-3, PI-4, ILO-9: PI-1)
Brief Description	In this course, mathematical concepts in the form of definitions and mathematical properties in the form of lemmas and theorems related to algebraic structures will be discussed, which include: groups, subgroups, normal subgroups, quotient groups, group homomorphisms, rings, classes of rings, ring homomorphisms, ideals, and quotient rings.
Course Materials	1. Group 2. Ring
References	**Main:**
	1. Gallian, J. A., *Contemporary Abstract Algebra*, Cengage Learning, Australia, 2017
	Additional:
	2. W. Keith Nicholson. 2012, "Introduction to Abstract Algebra", Wiley-Interscience [John Wiley & Sons], Hoboken, NJ, fourth edition, 2012. 3. Herstein, I.N., *Topics in Algebra,* John Wiley & Sons, New York, 1975
Learning Media	**Software:** / **Hardware:**
	• LMS Unand (http://fmipa.ilearn.unand.ac.id/) • Zoom meeting • Whatsapp / • Computer/Laptop • Smartphone
Team Teaching	1. Prof. Dr. Admi Nazra M.Sc. 2. Dr. Yanita, M.Si. 3. Nova Noliza Bakar, M.Si 4. Prof. Dr. I Made Arnawa, M.si.
Required courses	MAT61111 Introduction to Mathematics
Assessment	Homework, Quizzes, Mid-Term exam, Final exam
Academic Norms	https://akademik.unand.ac.id/images/2022-03-30%20Peraturan%20Rektor%20Nomor%207%20Tahun%202022%20Penyelenggaraan%20Pendidikan-

	khusus%20Bab%20II.pdf

I. Weekly Study Plan

Week / Meet (1)	Course Outcomes (2)	Indicator (3)	Assessment (4)	LEARNING ACTIVITY [TIME ESTIMATE] (5)					Subject, references (10)	Weight (11)	
				Synchronous*		Asynchronous**		Media (9)			
				Face to face Offline (5)	Face to face Online (6)	Individual (7)	Collaboration (8)				
1/1	**Non - CLO**	Discipline in carrying out college contracts; Accuracy in using set operations; Accuracy in describing the members of a set.	Activeness in lectures	Lecture: SSP introduction; Task Description; Assessment Explained [1 x 3 x 50 minutes]		-	.	• Whiteboard • Mymipa • WA	• Lecture Contract; SSP • Set Theory [1]		
2/2,3	**CLO-1**	Accuracy in showing a relationship is mapping/functioning. Accuracy in using the properties of integers. Accurately mention the definition of groups and	Activeness in lectures Homework 1	Lectures and discussions on mapping and integer concepts, definitions and examples of groups, and related properties. [1 x 1 x 50 minutes] AM (Self-activity):		-		• Whiteboard • Mymipa • WA	Mapping (one-on-one and on) Integer Group definitions and examples [1]	7,5%	

		examples. Originality of the results of the task		Students do assignments on sets, mapping, and integers. [1 x 2 x 50 minutes]							
3/4	**CLO-1**	Accuracy in proving some basic lemmas about the group Accuracy in mention definitions and examples of subgroups	Activeness in lectures •	Lectures and discussions about some basic lemmas about groups and subgroup [1 x 3 x 50 minutes]		-		• Whiteboard • Mymipa • WA	Some basic lemmas about groups Subgroup	7,5%	
4/5,6	**CLO-1**	Accuracy in mentioning definitions and examples of a coset Accuracy in mentioning definitions and examples of normal subgroups Honesty in doing quizzes.	Activeness in lectures • • Quiz 1	Quizzes about groups and subgroups [1 x 1 x 50 minutes] Lectures and discussions about cosets right, left cast, and definitions of normal subgroups, along with related properties.	-			• Whiteboard • Mymipa • WA	• coset (right and left) • Normal subgroups	7,5%	

				[1 x 2 x 50 minutes]							
5/7	**CLO-1**	Accuracy in proving properties related to normal cosets and subgroups Accuracy in describing quotient groups	Activeness in lectures •	Lectures and discussions about properties related to normal cosets and subgroups, and quotient groups. [1 x 3 x 50 minutes]	-			• Whiteboard • Mymipa • WA	Advanced normal subgroups Quotient groups	7,5%	
6/8,9	**CLO-2**	Accuracy in mentioning definitions and examples of group homomorphisms The precision determines the kernel of the group Accuracy in proving that the kernel is a normal subgroup Originality of the results of the task	Activeness in lectures • Homework 2	Lectures and discussions about the definition and examples of homomorphisms and kernels, as well as related properties. [1 x 3 x 50 minutes] AM: Student Work on tasks about normal subgroups, quotient groups, and group	-			• Whiteboard • Mymipa • WA	Group homomorphisms	10%	

				homomorphism [1 x 3 x 50 minutes]							
7/10	**CLO-2**	• Accuracy in proving a homomorphism is isomorphism .	Activeness in lectures •	Lectures and discussions on some of the properties associated with homomorphisms and kernels [1 x 3 x 50 minutes]	-			• Whiteboard • Mymipa • WA	Advanced group homomorphisms	10%	
8	**MID-TERMS EXAM**										
9/11,12	**CLO-3**	Accuracy in determining the definition of ring Accuracy in proving the properties ring	Activeness in lectures •	Lectures and discussions on Defines ring, along with examples and related properties. [1 x 3 x 50 minutes]	-			• Whiteboard • Mymipa • WA	Definition of ring	7,5%	
10/13	**CLO-3**	Accuracy in mentioning definitions and examples of integral areas. Accuracy in proving properties related to eigenvalues	Activeness in lectures • Quiz 2	quiz [1 x 1 x 50 minutes] Lectures and discussions about integral regions, as well as the properties associated with them. [1 x 3 x 50 minutes]	-			• Whiteboard • Mymipa • WA	• Integral domain	7,5%	

		and eigenvectors. Honesty in doing quizzes									
11/14,15	**CLO-3**	Precisely explain the concept of ring homomorphism Accuracy in proving the properties associated with ring homomorphisms Accuracy in Answering the questions given for the task.	Activeness in lectures • Homework 3	Lectures and discussions on Ring homomorphisms and the properties associated with them. [1 x 3 x 50 minutes]	-			• Whiteboard • Mymipa • WA	Ring homomorphisms	10%	
12/16	**CLO-4**	• Accuracy in mentioning the ideal definition • • Accuracy in showing that the ring and ideal form	Activeness in lectures •	Lectures and discussions on ideals and quotient rings [1 x 3 x 50 minutes]	-			• Whiteboard • Mymipa • WA	Ideal	10%	

		the ring (quotient)									
13/17, 18	**CLO- 4**	Accuracy in mentioning definitions and examples is maximally ideal. Accuracy in proving the relationship between rings. Ideal maximum and field. Honesty in quizzing	Activeness in lectures • Quiz 3	Quiz about rings and quotient rings [1 x 3 x 50 minutes] Lectures and discussions about the maximal ideal. [1 x 3 x 50 minutes]	-			• Whiteboard • Mymipa • WA	Ring quotient	7,5%	
14/19	**CLO- 4**	Precision in indicates that integral regions can be embedded in the field. Accuracy in answering tasks Originality of the results of the task	Activeness in lectures • Homework 4	Lectures and discussions on integral areas and fields [1 x 3 x 50 minutes] AM: Students do assignments about the maximum ideal in. [1 x 3 x 50 minutes]	-			• Whiteboard • Mymipa • WA	maximal Ideal	7,5%	

15/2 0,21	**CLO- 4**	Accuracy in explaining and understanding related material	Activeness in lectures	Discussion and discussion about rings, integral regions, ring homomorphisms, ideals, ideals and maximums. [1 x 3 x 50 minutes]	-			• Whiteboard • Mymipa • WA	Review		
16	**FINAL EXAM**										

*SM = sinkronus maya, AM = asinkronus mandiri, AK = asinkronus kolaboratif

Indicators, criteria and weights of assessment

1. Assessment Weight of Each Form of Assessment

NO	ASSESSMENT COMPONENTS	WEIGHT (%)
Results Assessment		
1	Final Exam	30%
2	Mid-term Exam	30%
3	Homework	20%
4	Quiz	20%
TOTAL		**100 %**

1. Assessment Weight of Each Course Learning Outcome
   - CLO-1: 30 %
   - CLO-2: 20 %
   - CLO-3: 25 %
   - CLO-4: 25 %

Assessment Plan Table

Assessment

CLO	Final Exam	Mid-term Exam	Home work	Quiz			Total weight
1. Able to explain the meaning of groups, subgroups, normal groups, and quotient groups, and prove related properties.	-	20%	5%	5%	-	-	30%
2. Able to explain the meaning of homomorphisms and isomorphisms in groups and prove related properties.	-	10%	5%	5%	-	-	20%
3. Able to explain the meaning of ring, classes of rings, and ring homomorphisms and prove related properties.	15%	-	5%	5%	-	-	25%
4. Able to explain the ideal understanding and quotient ring, and prove related properties.	15%	-	5%	5%	-	-	25%
Total Weight	30%	30%	20%	20%	-	-	100%